BERK ISKENDER

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EDUCATION

- **University of Illinois Urbana-Champaign (UIUC), IL, US** — Overall GPA: **3.94/4.00**
  MS/PhD, ECE **Advisor**: Prof. Yoram Bresler **MS Graduation:** 2020 Fall / **PhD Expected**: 2024 Spring
- **Middle East Technical University (METU), Ankara, TR** — Overall GPA: **4.00/4.00**
  B.S. Electrical Engineering **Rank**: 1st (**Valedictorian**) **Graduation**: June 2018

EXPERIENCE

Summer/Fall 2022 — *PhD SWE Internship / Student Researcher*, ***Google - CA, US***
· Research on improving self-supervised dense contrastive learning of uncurated data using different dense comparison methods and reconstruction decoders, work accepted to NeurIPS 2022 Self-Supervised Learning - Theory & Practice Workshop.

Summer 2021 — *PhD SWE (Machine Learning) Internship,* ***Google - CA, US***
· Implemented & compared various visual-semantic image embedding techniques, deployed a novel Supervised Contrastive Learning-based method (to be productionized) to replace an attribute-based embedding one to assist graph-hierarchical clustering at Google Geo.

Summer 2020 — *Research Internship,* ***Los Alamos National Lab joint with Michigan State University (MSU) - MI, US***
· Worked on developing block-matching algorithms with learned sparsifying transforms for image denoising (published in IEEE ICIP 2021) and dynamic estimation methods. **Advisor:** Prof. Saiprasad Ravishankar

Summer 2019 — *Graduate Research Internship,* ***Los Alamos National Laboratory (LANL) - NM, US***
· Worked on Machine/Deep Learning based tomographic reconstruction methods for ill-posed single view reconstruction.

Summer 2017 — *Internship,* ***ASELSAN Advanced Sensing Research Program Department - Ankara, TR***
· Performed time & frequency domain passive acoustic mapping, sparsity-based microbubble detection using constrained optimization methods for ultrasound imaging.

Summer 2016 — *Internship*, ***KAREL Electronics Research & Development Center – Ankara, TR***
· Performed image processing tasks for vehicles on ARM NXP iMX6 by cross compilation of OpenCV libraries.

Teaching Graduate teaching assistant of Digital Signal Processing course for Fall 2019, Spring 2020 and Fall 2020

PUBLICATIONS

- B. Iskender, Z. Xu, S. Kornblith, E. Chu, M. Khademi, "Improving Dense Contrastive Learning with Dense Negative Pairs", *3rd Workshop on Self-Supervised Learning: Theory and Practice, NeurIPS 2022.*
- B. Iskender, M. Klasky, Y. Bresler, "Dynamic Tomography Reconstruction by Projection-Domain Separable Modeling", *arXiv*:2204.09935*, IEEE IVMSP 2022*.
- B. Iskender, Y. Bresler, "Scatter Correction in X-ray CT by Physics-Inspired Deep Learning", *IEEE Transactions on Computational Imaging*, *2021.*
- S. Liang, B. Iskender, B. Wen, S. Ravishankar, "Learned feature-domain block matching (LABMAT) for image restoration", *IEEE ICIP 2021*.
- B. Iskender, Y. Bresler, "A physics-motivated DNN for X-ray CT scatter correction", *IEEE 17th Intl. Symposium on Biomedical Imaging*, *IEEE ISBI 2020*.
- B. Iskender, Y. Bresler, "X-ray CT scatter correction by a physics-motivated DNN with opposite view processing", *The 6th Intl. Conf. on Image Formation in X-Ray CT (CT Meeting 2020).*
- B. Iskender, S.F. Oktem, "Image restoration for sparse aperture optical systems", *26th Signal Proc. and Comm. Applications Conference (SIU), 2018.*

RESEARCH INTEREST

- Interested in machine learning, computer vision, signal processing, computational imaging & the theory of inverse problems.
- Currently working on time-varying tomographic reconstruction using analytical and generative models.
- Worked on de-scattering inverse problem in X-Ray CT imaging using physics-motivated deep learning and analytical methods for MS.
- Worked on sparsity-based deconvolution for periodic aperture imaging and on the role of priors in image reconstruction in B.S.

SEVERAL PROJECTS & COURSEWORK

- ***Computer Vision:*** *Project:* Implementation and comparison of S-o-A algorithms for agricultural image segmentation
  Coursework: content-based image retrieval, shape retrieval, image registration, optical flow calcs, scale-space blob detection…
- ***Machine Learning:*** Project on supervised image super-resolution and denoising on low dose X-Ray images
- ***Machine Learning for Signal Processing:*** Project on developing a possible super-resolution objective maximizing Fourier shell correlation and combined the new metric with existing GAN based methods
- ***Generative AI Models:*** Application of deep prior for video generative models to dynamic tomography reconstruction
- ***Digital Imaging:*** Project on CNN-based projected gradient descent for consistent X-ray CT scatter correction
- ***Vector Space Signal Processing****:* Project on reducing spatially varying out-of-focus blur
- ***Computational Inference and Learning:*** Project: Analysis of LASSO problem and comparison of various analytic/learning based algorithms
- ***Senior Project****:* Implemented computer vision tasks (shape detection, motion control and decision) of a basketball playing robot on Raspberry Pi 3
- ***Digital Signal Processing II:*** Project on solving ill-posed inverse problems using ML and classical approaches, coursework on audio compression, transform coding, and signal recognition via Fourier series representation
- ***Probability & Random Var.:*** Project on maximum likelihood parameter estimation from observations in detection of moving objects
- ***Communications I:*** Project on hypothesis testing for amplitude or frequency modulated signals
- ***Random Processes, Convex optimization, …***

QUALIFICATIONS

- **Programming**: **Core:** Python, Pytorch, TensorFlow, Matlab, LaTeX, OpenCV **Used for various tasks:** SQL, C/C++, HTML, ARM Assembly
- **Application, Software**: Github, GEANT4, LabView, Altera Quartus, LTSpice, Kubotek Keycreator (CAD), MS Office
- **Operating Systems**: Linux OS, Linux Board Support Package (BSP), MS Windows OS
- **Languages**: English (Proficient), Turkish (Native), Spanish (Beginner)

ACHIEVEMENTS & AWARDS

- Ranked 1st in the EE department (Valedictorian) in Middle East Technical University, 2018
- METU EE Bulent Kerim Altay Award (6 times) (Highest academic performance award for the related semester given by department)
- Nationwide Top 100th scholarship given by the Turkish Ministry of Education
- 420th in the national university entrance exam over 2 million students and 28th in English proficiency in the national university exam